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(56) Documents Cited

**GB 2031178 A GB 1342403 A GB 0898017 A**

(58) Field of Search

UK CL (Edition O ) **B4C**

INT CL<sup>6</sup> **B23B 45/00 45/02 , B25D 17/20 17/22 , B25F  
5/00 5/02**

## (54) Hand machine tool

(57) A hand machine tool 1 has a machine housing 9 in which openings 13 of a cooling blower (11, Fig 3) are provided, through which cooling air 33 is blown outwards. The openings 13 are at least partially overlapped by a guide element 14 of an attachment 17 so that the cooling air 33 is conveyed through a cooling channel 15, 22 to a working region 16 of the attachment 17 to be cooled and passes from there through openings 23, 23a into the open air.

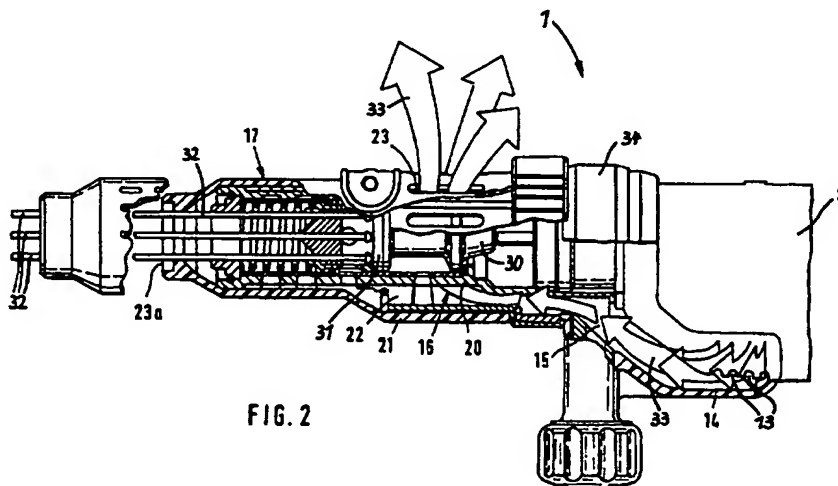


FIG. 2

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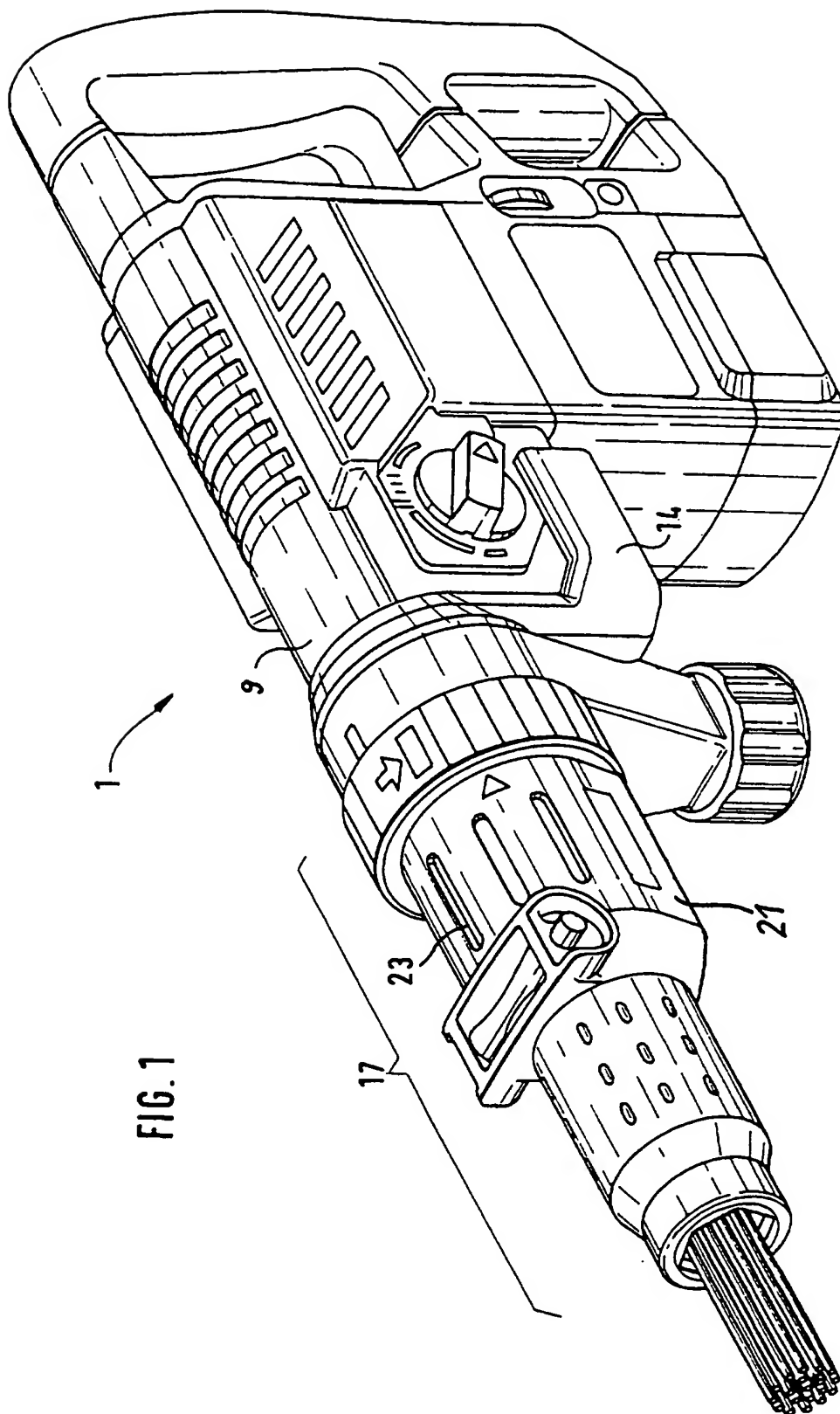


FIG. 1

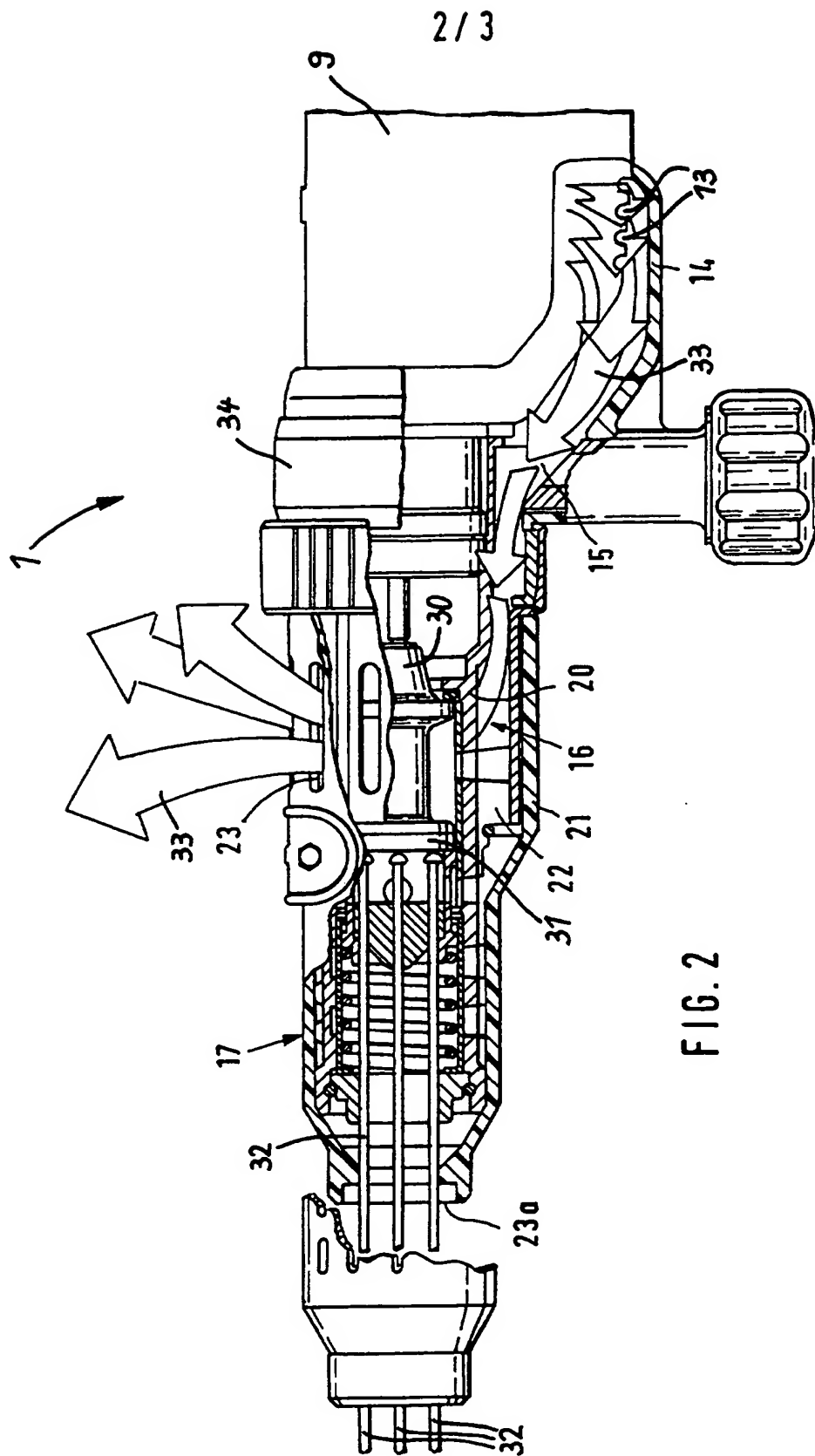


FIG. 2

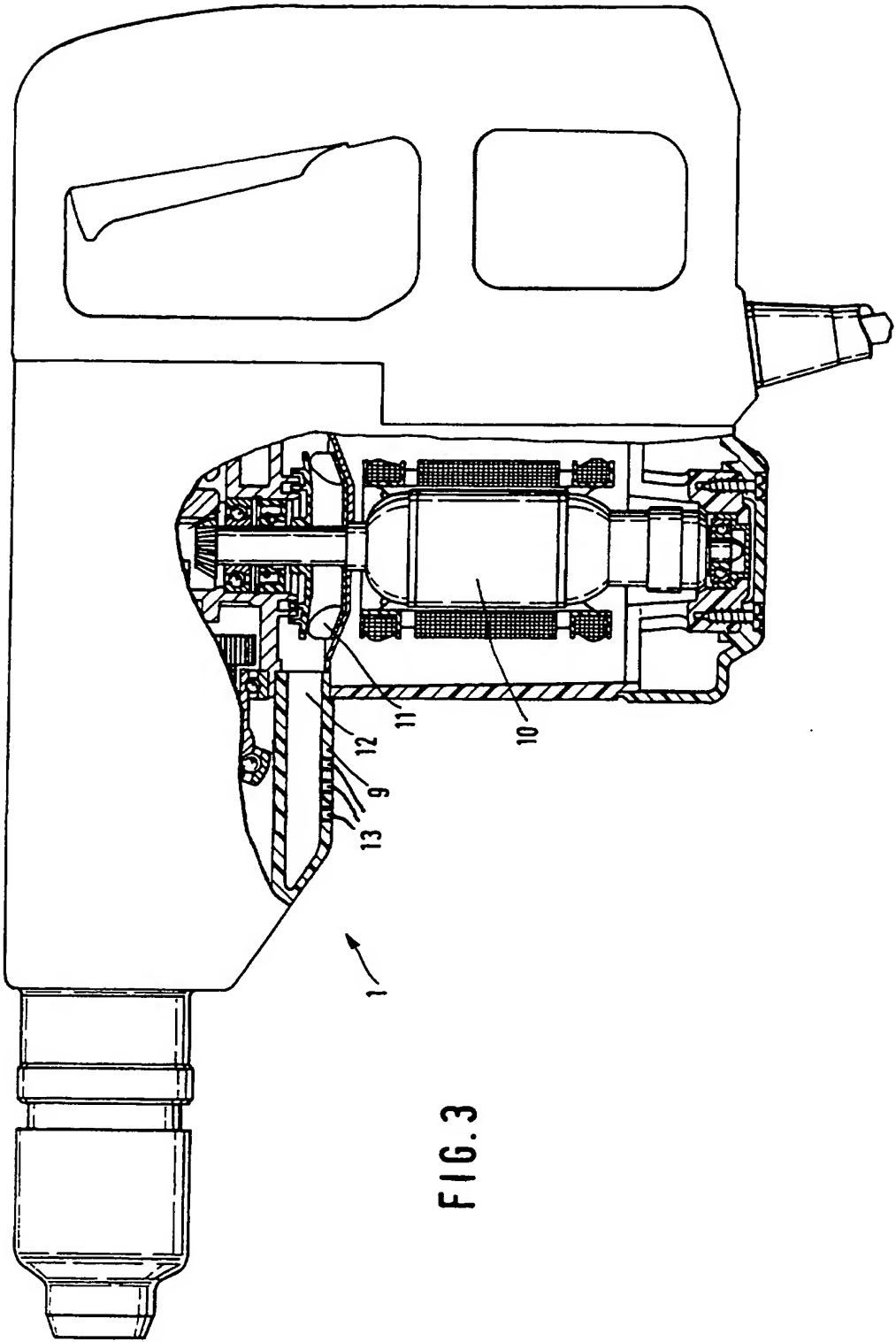


FIG. 3

Hand machine tool with attachment

## Background art

- 5 The invention proceeds from a hand machine tool according to the preamble of claim 1 and from an attachment according to the preamble of claim 5.

Hand machine tools are already commercially known which have a cooling blower, drivable by the drive motor, for cooling the drive motor and/or the gear  
10 unit and the percussion mechanism. There, the cooling medium, in particular air, is conveyed from the cooling blower out through at least one opening in the housing and, conversely, in through the at least one opening to the cooling blower.

- 15 It is further known to provide hand machine tools with attachments. Examples of attachments for hammer drills are:

- chisel attachment for chiselling.
- angle drilling head for drilling in confined spatial conditions,
- needle chipper for removing surface material, e.g. in concrete  
20 renovation.

The attachments are, for example, pushed onto the collar of the drills or hammer drills, where they are braced or alternatively positively locked against rotation. In the case of said attachments, the transmission of drive power, e.g.  
25 impact energy, is effected from the machine via the attachment to the tool. Friction losses during transmission of the drive power may lead to considerable heating of the attachments. In attachments enabling an impact transmission, it is primarily the surge transfer surfaces which heat up. But friction losses at the guides of the oscillating impact transmission elements (sets) also contribute to a

not inconsiderable extent towards heating of the attachments. After only a short operating time (20 to 30 minutes) known attachments are therefore often so hot that they may no longer be touched even by someone wearing gloves. When operated for a longer period, particularly in the case of attachments with plastic housings, breakdowns may arise as a result of the melting of structural elements.

#### Advantages of the invention

The hand machine tool according to the invention having the features of claim 1 or the attachment connectable to the hand machine tool and having the features of claim 5 has the advantage that the attachment is cooled by the incoming and outgoing air of the cooling blower of the hand machine tool. Thus, a higher impact energy may be transmitted via the attachment without the maximum allowable contact temperature of the attachment being exceeded, i.e. work may proceed more quickly and gloves are not needed as a protection against burns. The operating time of the attachment need not be limited in order to prevent overheating. Plastic parts are not subject to thermal overload. The internal temperatures in the region of the attachment and in the region of connection to the hand machine tool are reduced.

Advantageous developments and improvements of the hand machine tool according to the invention and of the attachment according to the invention are possible by virtue of the measures indicated in the dependent claims.

It is particularly advantageous when the guide element is constructed on the removable attachment and, once the attachment has been fitted onto the hand machine tool, at least partially overlaps an opening in the housing for passage of the cooling medium. When the attachment is not fitted, special cooling is

not needed so that it is then possible to dispense with a special cooling air circuit.

### Drawings

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An embodiment of the invention is illustrated in the drawings and described in detail below. Of the drawings, Figure 1 is a perspective view of a hammer drill with an attachment fitted thereon, Figure 2 a longitudinal section through the attachment and Figure 3 a partial section through the hammer drill with the  
10 attachment removed.

### Description of the embodiment

In Figure 1, 1 denotes a hammer drill as an example of a hand machine tool.  
15 The hammer drill 1 comprises a machine housing 9 adjoined at the tool end by an attachment 17, here a needle chipper. The attachment 17 in turn comprises an outer housing 21, in which continuous slots 23 are disposed to enable a cooling medium to pass out and in. Disposed at the machine end of the outer housing 21 of the attachment 17 is a projecting guide element 14, which  
20 overlaps a sub-region of the machine housing 9.

Figure 2 shows a longitudinal section through the attachment 17, which is fitted onto the machine housing 9. In the region of the machine housing 9, the outer housing 21 of the attachment 17 forms the projecting guide element 14 which  
25 fits like a shell snugly against the machine housing 9 and overlaps the openings 13 in the machine housing 9. The guide element 14 in the present case is designed as part of a clamping holder 34.

The outer housing 21 is preferably made of less strongly heat-conducting material, in particular of plastic material. The attachment 17 further comprises an inner housing 20 which surrounds a working region 16 of the attachment 17. Housed in the working region 16 are impact transmission elements, sets 30, 31, which in the percussive mode of the drill hammer generate frictional heat which leads to heating of the attachment 17. The inner housing 20 is made of a relatively highly heat-conducting material which guarantees adequate removal of the frictional heat from the working region 16.

In the working region 16, steel needles 32 are moreover guided in an axially displaceable manner and acted upon axially by thrusts of the set 31, as a result of which frictional heat likewise arises. Formed between the inner housing 20 and the outer housing 21 is a cooling channel 22, which opens at the machine end into a cooling channel 15 formed between the machine housing 9 and the guide element 14. At its other end, the cooling channel 22 is connected to the slots 23 as well as to an opening 23a in the region of a front needle guide of the attachment 17.

Figure 3 shows a partial section through a hammer drill 1. The drive motor 10 drives a cooling blower 11, which delivers cooling air through an air-conveying channel 12 to the openings 13. The cooling air then passes out through the openings 13 in the machine housing 9.

When attachment 17 has been fitted onto the hammer drill 1, at least some of the air stream delivered by the cooling blower 11 is directed by the guide element 14 into the cooling channel 12, 22. There, it sweeps the working region 16 of the attachment 17 and is blown out through the slots 23. The path of the flowing cooling medium is illustrated in Figure 2 by arrows 33. The



cooling medium moreover passes also to the opening 23a and in particular also cools the needles 32.

It is also conceivable for the cooling medium to be conveyed in the opposite direction through the cooling channel 22, 15, the openings 13 and the air-conveying channel 12 to the cooling blower 11. The invention may be used advantageously also for attachments of other hand machine tools. The guide element 14 may optionally be constructed alternatively on the machine housing 9.

**CLAIMS**

1. Hand machine tool, in particular a hammer drill and/or striking hammer, having a machine housing (9) accommodating a drive motor (10), a cooling blower (11) drivable by the drive motor (10), as well as having at least one air-conveying channel (12) which conveys a cooling medium from the cooling blower (11) out through at least one opening (13) in the machine housing (9) or, conversely, in through at least one opening (13) to the cooling blower (11), characterized in that the hand machine tool (1) is provided with a guide element (14), which is movable into a position of at least partial overlap of the at least one opening (13) and which via a cooling channel (15, 22) delivers cooling medium to a working region (16) of the hand machine tool to be cooled or via the working region (16) of the hand machine tool conveys cooling medium to the air-conveying channel (12).
2. Hand machine tool according to claim 1, characterized in that the guide element (13) is constructed on a removable attachment (17) of the hand machine tool, in particular an attachment (17) for chiselling by means of a plurality of steel needles (32), and, once the attachment (17) has been fitted onto the hand machine tool (1), at least partially overlaps the at least one opening (13) in the housing (9) of the hand machine tool (1).
3. Hand machine tool according to claim 2, characterized in that the attachment (17) comprises a highly heat-conducting inner housing (20), in particular of metal, which is surrounded by a less strongly heat-conducting outer housing (21), in particular of

plastic material, so as to form cooling channels (15, 22) between said housings and outlet or inlet openings (23, 23a) for the cooling medium which are provided in the outer housing (21).

- 5     4.     Hand machine tool according to one of claims 2 or 3, characterized in that the cooling blower (11) delivers cooling air through the openings (13) to the attachment (17).
- 10     5.     Attachment for fitting onto a hand machine tool in particular according to one of claims 1 to 4, characterized in that the attachment (17) comprises a highly heat-conducting inner housing (20), in particular of metal, which surrounds a working region (16) and is surrounded by a less strongly heat-conducting outer housing (21), in particular of plastic material, so as to form cooling channels (15, 22) between said housings and outlet or inlet openings (23, (23a)) for the cooling medium which are provided in the outer housing (21), and that the attachment (17) comprises at least one guide element (13) for the cooling medium which may be brought into at least partial overlap with at least one opening (13) in the housing (10) of the hand machine tool, through which opening cooling medium is conveyed out from a cooling blower (11) of the hand machine tool or, conversely, in through the at least one opening (13) to the cooling blower (11) of the hand machine tool.
- 15     20     25
6.     Attachment according to claim 5, characterized in that the guide element (14) is constructed on a clamping holder (34) which is used to connect the attachment (17) to the machine housing (9).

7. **A hand machine tool substantially as herein described with reference to the accompanying drawings.**

5 8. **An attachment for fitting on to a hand machine tool, substantially as herein described with reference to the accompanying drawings.**



Application No: GB 9702419.4  
Claims searched: 1-8

Examiner: Hal Young  
Date of search: 14 April 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B4C

Int Cl (Ed.6): B23B(45/00, 02) ; B25D(17/20, 22) ; B25F(5/00, 02)

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2031784 A (BOSCH), see fig, noting fan 56 and cooling flows 70, 71.	
A	GB 1342403 (BOSCH), see fig 1, noting fan 31 and cooling space 10.	
A	GB 898017 (BOSCH), see fig, noting blower 20 and cooling duct 12.	

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.